Analyser SWIRES RESEARCH SA87

By G8MNY   (New Jan 21)
(8 Bit ASCII graphics use code page 437 or 850, Terminal Font)

I bought this /P Cable TV spectrum analyser at a rally in 2000. It came with a nice leather carrying case & charger, but a flat PB battery. I was made from 1988 & my one in 1991 in Basildon Essex. The 1st SA in the world to use a LCD display was their earlier SA85 model!

```
                                                         Brill  Freq
┌─────────────────────────────────────────────────────────────────────────┐
│       oAux ┌─────────────────────────────────────────┐    (_)  (  )     │
│ (■)In      │                                         │ on          o (·)│ Cal
│ High  oDC  │                 L C D                   │ off o sweep oIF  │
│            │      D I S P L A Y   S C R E E N        │band o  (  )      │
│       oLED │                                         │ pk  o      o     │  IF
│ (■)In      └─────────────────────────────────────────┘            (_)   │ Gain
│ Low                                                     Y(_) X(_)       │
└─────────────────────────────────────────────────────────────────────────┘
                                                                  Phones
```

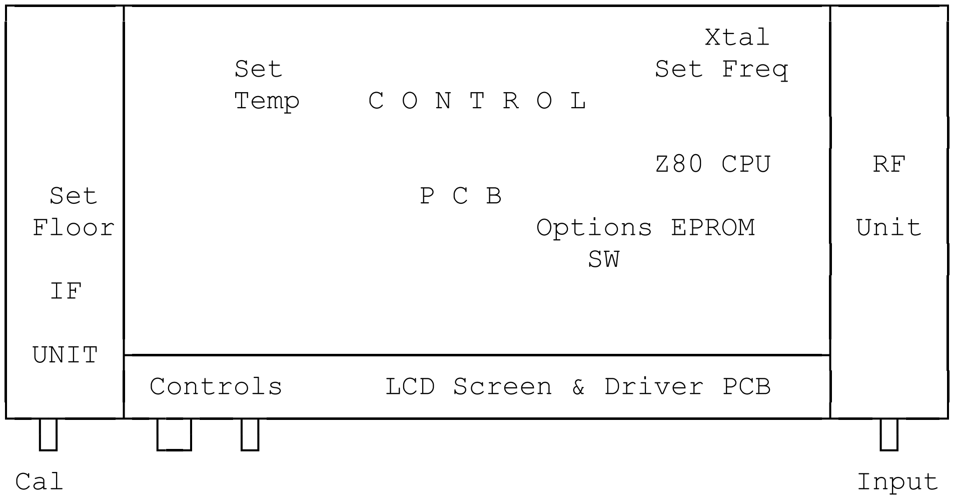
It came with no information, so a lot or reverse engineering done to make a full set of diagrams. But I did have a little success with an information advert sheet from the maker & some history.

FEATURES
Freq   : 2 bands 5MHz-450MHz & 450-910MHz (External mixer gives to 1750MHz)
Input1 : 75Û BNCs up to 77dBuV (17dBmV) (Actually 20dB Better)
Input2 : 75Û BNCs 30dB attenuated, to 117dBuV (47dBmV) (Actually 20dB Better)
IF Gain: 10x 3dB steps
IF B/W : 300kHz, added a 30kHz narrow filter option
Cal   : 75Û BNC 50MHz @ 5mV terminated, 74dBuV (14dBmV)
Sweep : Around 4 per sec, gives start & end frequencies
Y   : Cursor On floor (my mod) changes Y scale to 5dB/Div
Y   : Off floor scale is 3dB/Div & reads out to +/- 0.2dB, 0.1uV
Pk hold: Shows the peak added up over time
X   : Cursor line gives frequency readout @ its position
X   : Cursor on LHS stops sweep, & draws level line, & H/P can be used
Phones : I added AM Rx opamp driving 3.5mm jack, used when sweep stopped
Display: LCD, added 5 x 10 graticule to estimate the display
AUX   : Powers down converter & adjusts Freq display to 1750MHz max

TESTING
Other than an expired small 12V Pb battery it all worked.

INSIDE

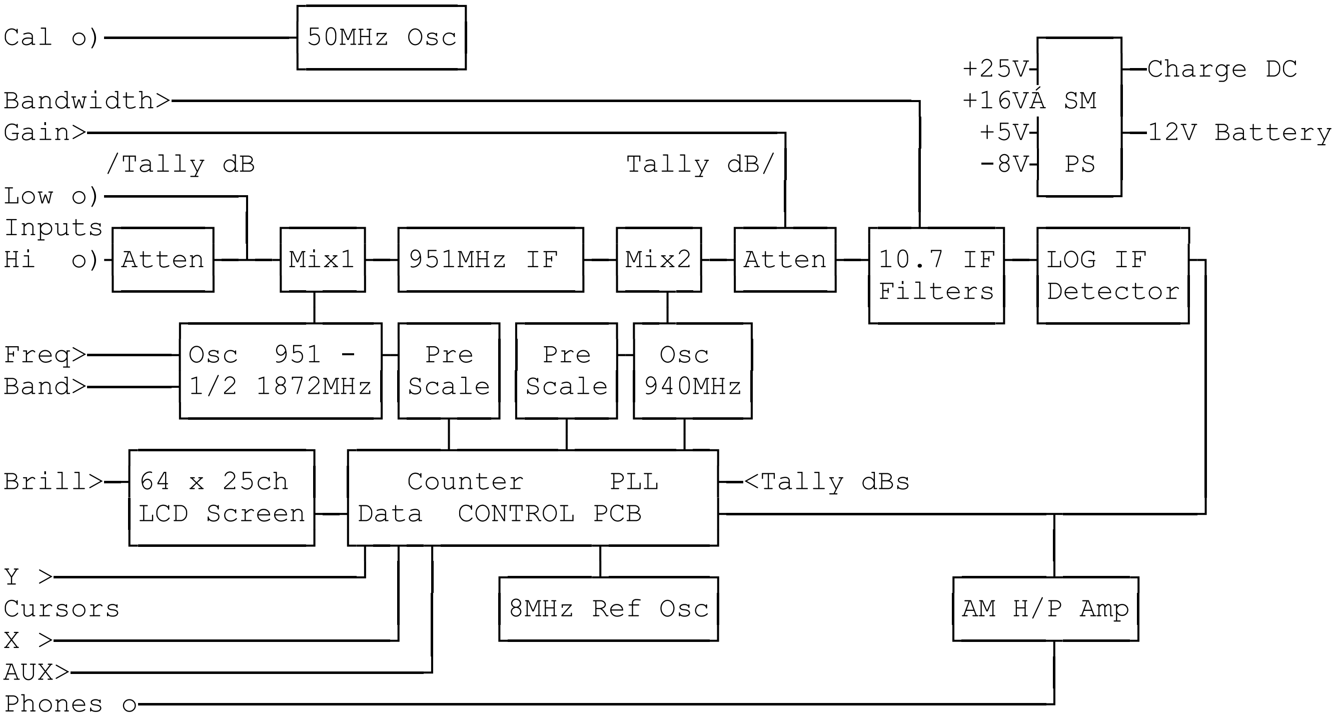
Is a double conversion RF module, 10.7MHz IF Module & calibrator, Control PCB with my piggy backed mods board, Screen Display PCB,LCD, & Controls, DC SMPSU & battery on the top. All inter-connected with plug in lose wire leads (no frail ribbons).



Underside View

Topside has
SMPSU & battery
in the middle
& Set IF Gain.

SCHEMATIC



Understanding the internals does help you use gear better!

MODIFICATIONS
1/ Change Pb battery for a 10x 500mA Nicad pack. Adjusted charging shutoff
2/ Added charger plug top status indicators
3/ Added switched narrow 30kHz filter, with sweep width reduction
4/ LCD Brill, range reduced so display not lost
5/ Added another 930MHz IF image trap
6/ Vertical range increased from 18dB to 30dB when Y cursor at bottom
7/ Made graticule for 5/3dB per div indication
8/ Added Sweep stop, with X cursor at LHS
9/ Added H/P amp & 3.5mm socket for AM Rx
10/ Modified Eprom data to remove annoying error message on over scan
11/ Added LCD front panel foil screening to reduce aerial QRM pick up
12/ Made Down converter to see & read to 1750MHz with 900MHz free running osc

IN USE
This /P Spectrum Analyser with no pick up leads, has the advantage it is easily used to identify QRM sources, to show where they are. With a telescopic aerial or clip on ferrite pickup one can identify leads that need attention & actually measure any improvement.

The peak hold can be used to log the occasional QRM source & identify its level & frequency.

In aerial testing the accurate 0.2dB readout can be used for comparing aerials measuring gain etc. I use a Scanmaster SP-25 gasfet pre-amp too.

With my VHF pulse tester or a high-level noise source, filter can be tuned up, like a tracking generator.

MATCHING
Although the 75Û impedance may be a nuisance. However a simple 2 resistor impedance change 5dB attenuator using a 42Û in series & 91Û across the 50Û port will match correctly (non inductive Rs).

```
50Û o)──┬──42──>75Û          50Û o)──────┐ ┌─>75Û
     │  91      │        OR         │ ())))))  │         5x5=25, x2=50Û
     └──┴──────┘                  └─┴────────┘ 1dB??   6x6=36, x2=72Û
        5dB                     Broadband ferrite beed
```

Or use a 5-6 turn ferrite bead auto-transformer.

Further reading;-
Also see my Tech buls on "Spectrum Harmonic Demo circuit", "A Versatile Pulse Tester", "Clip on QRM Probe". "Spectrum Analyser mods 88-89", "Analyser Takeda Riken TR4122B", "Power Line Telecomm QRM", "SSB Demo circuit", "Marconi 2019A Sig Gen", "FeelTeck Dual DDS Osc FY6600-60M", & "RF Directional Coupler".

Why don't U send an interesting bul?

73 de John G8MNY @ GB7CIP